REMARKS

Claims 1-20 are pending in the application. Applicant respectfully requests entry of new Claim 21 and the foregoing amendments to claims 1, 10, 19, and 20 prior to further examination. No new matter has been introduced. Acceptance is respectfully requested.

Regarding Section 103 Rejections

Claims 1-20 have been rejected under 35 U.S.C. § 103 (a) as being unpatentable over Braly (U.S. Patent No. 5,941,222) in view of Straub *et al.* (U.S. Patent No. 6,842,672, hereafter Straub). The Applicants have amended independent Claims 1, 10, 19, 20, and new Claim 21 to further distinguish the step of providing an operator with a lean state indication for optimizing fuel flow while an engine is actively providing motorized transportation. Support for these claim amendments can be found throughout the Applicants' application as originally filed. (See, e.g., Specification pages 11-12.). The Applicants adds no new subject matter. The rejections are respectfully overcome and reconsideration is requested.

Claims 1-20, as now amended, and new Claim 21 of the present invention relate to assisting an operator in engine fuel mixture leaning for optimum fuel flow while an engine is actively providing motorized transportation. For example, the claimed invention may assist a pilot in leaning the fuel mixture for best power or for best economy while an aircraft engine is actively providing cruise flight. In the case of an aircraft engine having a plurality of cylinders, upon receiving a request for setting an optimum fuel flow, the plurality of cylinders is monitored for an increase in exhaust gas temperature (EGT) as the fuel flow is decreased. Upon detecting a first peak EGT in a first cylinder, the first cylinder is identified to the pilot via a display. The display shows a graphical representation of the measured EGT for each cylinder of the aircraft engine. Subsequent peak EGTs are monitored and are dependant on fuel flow after the first cylinder has been identified. The pilot is provided, via the display, with a lean state indication for optimizing fuel flow while the engine is actively providing motorized transportation. Accordingly, by providing the pilot with the lean state indication for optimizing fuel flow, the Applicants' claimed technique enables the pilot to easily lean the aircraft's engine for best power

or best economy while in flight. (*See* Specification, page 12, lines 8-9; page 11, lines 14-29; page 16 lines 20-24).

Braly provides a fuel injector matrix to optimize the operating efficiency of an internal combustion engine. Each fuel injector includes a metering orifice sized for each of the combustion cylinders of the engine to provide a uniform fuel to air ratio to all the cylinders such that all the cylinders reach a peak exhaust gas temperature at a common total engine fuel flow.

Straub provides a system and method for integrated control, access, and presentation of flight information within the cockpit. The system and method include cockpit instrument systems and methods having a first cockpit instrument panel which has a first display proximately located to a first bezel. The first display is operable to present navigational data, communication data, and flight information data including airspeed, attitude, and altitude.

The Applicants' now amended claimed invention is distinct from Braly because 1) Braly does not teach, suggest, or otherwise make obvious a system having an operator with a lean state indication for optimizing fuel flow while an engine is providing motorized transportation, and 2) Braly does not address the same problems as appreciated by the Applicants' claimed invention.

Regarding point 1, the Braly reference does not describe providing an operator with a lean state indication for optimizing fuel flow while the engine is actively providing motorized transportation. In contrast, Braly merely describes matching a set of fuel injectors to achieve a balanced fuel/air ratio in all cylinders. To match the set of fuel injectors, Braly first describes testing the injectors installed in the engine to empirically determine the total engine fuel flow. Braly then describes observing the fuel injector flow rate of each fuel injector by removing the fuel injectors from the engine and bench testing them. After removing and bench testing the fuel injectors, the Braly reference further describes a user resizing the fuel injectors or replacing the fuel injectors. In summary, Braly in matching a set of fuel injectors describes: i) removing the fuel injectors from the engine, ii) bench testing each fuel injector, and iii) resizing the fuel injectors or alternatively replacing the fuel injectors. In this way, the steps described by Braly are steps which cannot take place while the engine is providing motorized transportation, as now claimed in Amended Claims 1, 10, 19, 20 and new Claim 21. For example, an aircraft cannot remain in flight when the fuel injectors are removed from its engine. Moreover, the steps described by Braly are steps likely performed by an engine manufacturer or an engine mechanic,

not an operator of an engine. (*See* Braly, col. 7, lines 4-7; col. 7, lines 12-13; col. 7, lines 42-44; and col. 9, lines 36-50).

Regarding point 2, the Applicants address the complexity of the engine fuel mixture leaning process as the cause of the problem. Owing to the complexity of the process, pilots do not lean the fuel flow mixture resulting in use of more fuel than necessary. Additionally, pilots decide on an arbitrary power setting with no attempt to achieve best power. (*See* Specification, page 2, lines 5-11). Braly does not teach, suggest, or otherwise make obvious addressing the complexity of the process as the cause of the problem. In contrast, Braly states "that the cause of the unbalanced fuel mixture is...the result of occult transfer of fuel from upstream combustion cylinders to downstream combustion cylinders through the induction plumbing system." Braly continues with, "by considering the downstream effects of occult transfer of fuel, the present invention recommends compensating new size injectors for all cylinders." In this way, Braly recognizes the cause of the problem as inherent to the engine, rather than addressing the cause of the problem as inherent to the complexity of the engine fuel mixture leaning process. Where there is no evidence of record that a person of ordinary skill in the art at the time of the Applicants' invention would have expected the cause of the problem (namely the complexity of the engine fuel mixture leaning process) to exist at all, it is not proper to conclude that the now amended claimed invention (namely providing an operator with a lean state indication for optimizing fuel flow while an engine is providing motorized transportation) would have been obvious to that hypothetical person of ordinary skill in the art. (*See* Braly, col. 6, lines 13-17; col. 6, lines 57-60).

Accordingly, from the discussion of Braly: 1) removing, bench testing, and resizing or replacing fuel injectors, and 2) occult fuel transfer as the cause of fuel/air imbalance, Braly does not and cannot disclose, suggest, or otherwise make obvious the present invention providing an operator with a lean state indication for optimizing fuel flow while an engine is actively providing motorized transportation as claimed in Amended base Claims 1, 10, 19, 20 and new Claim 21. In fact, the design of Braly does not address the complexity of the fuel mixture leaning process as the cause of the problem.

Similar to Braly, Straub does not disclose, suggest, or otherwise provide an operator with a lean state indication for optimizing fuel flow while the engine is actively providing motorized

transportation as now claimed in Amended base Claims 1, 10, 19, 20, and new Claim 21. Rather, Straub merely describes integrating control access and presentation of flight data within a cockpit. In fact, the Straub reference does not mention an engine fuel mixture leaning process.

Accordingly, there is no suggestion or motivation to combine Braly and Straub when the combination does not describe or suggest all the claim limitations. The combination of Braly and Straub merely describes using a computer to empirically determine the total engine flow by testing the engine with the fuel injectors installed, removing the fuel injectors from the engine, using a computer to bench test the removed fuel injectors, and then using a computer to resize the removed fuel injectors or to replace the removed fuel injectors with a new set of fuel injectors to be installed.

The foregoing patentable distinctions are recited in now amended independent Claims 1, 20, and new Claim 21 with the following language or similar language:

"providing an operator with a lean state indication for optimizing fuel flow while the engine is actively providing motorized transportation."

Now amended Independent Claims 10 and 19 recite a similar distinction in terms of a system and an apparatus. Accordingly, Claims 10 and 19 are all patentably distinct over the references for the same reason.

Claims 2-9 depend from now amended independent Claim 1 and Claims 11-18 depend from now amended independent Claim 10 and are allowable for the same reasons.

Accordingly, the Applicants respectfully submits that the claimed invention, as now amended, is not made obvious by the cited references or any references. The Applicants respectfully request the withdrawal of the rejections under § 103(a) and the allowance of Claims 1-20 and new Claim 21.

Information Disclosure Statement

A Supplemental Information Disclosure Statement (SIDS) is being filed concurrently herewith. Entry of the SIDS is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By_____
Joseph M. Maraia
Registration No. 55,926
Telephone: (978) 341-0036
Facsimile: (978) 341-0136

Concord, MA 01742-9133
Dated: 12/24/15